CLAIM LISTING AND STATUS

1. (original) An interferometric detection system comprising:

a) a plastic substrate;

b) a first rectangular channel formed in said substrate for reception of a liquid sample to be analyzed;

c) a coherent light source for generating a coherent light beam, said light source being positioned to direct said light beam into said channel to thereby generate backscattered light comprising interference fringe patterns, said fringe patterns including a plurality of spaced light bands whose positions shift in response to changes in the refractive index of said liquid sample; and

d) a photodetector for receiving said backscattered light and generating one or more intensity signals that vary as a function of positional shifts of said light bands.

2. (original) The interferometric detection system of claim 1, wherein said substrate is formed from PDMS.

3. (original) The interferometric detection system of claim 1, wherein said laser beam is selected to have a diameter of 2 mm or less.

4. (original) The interferometric detection system of claim 3, wherein said channel has a width that is no larger than said diameter of said laser beam.

5. (original) The interferometric detection system of claim 1, further including a second rectangular channel formed in said substrate, said second channel acting as a reference channel for detection and compensation of background interference.

6. (original) A method for determining a characteristic of a sample comprising the steps of:

a) providing an interferometric detection system comprising:

1) a plastic substrate;

2) a first rectangular channel formed in said substrate for reception of a liquid sample to be analyzed;

3) a coherent light source for generating a coherent light beam, said light source being positioned to direct said light beam into said channel to thereby generate backscattered light comprising interference fringe patterns, said fringe patterns including a plurality of spaced light bands whose positions shift in response to changes in the refractive index of said liquid sample; and

4) a photodetector for receiving said backscattered light and generating one or more intensity signals that vary as a function of positional shifts of said light bands;

b) introducing a sample to be analyzed into said first rectangular channel; and

c) determining a characteristic of said sample by analyzing said one or more intensity signals generated by said photodetector when said sample is in said channel.

7. (original) The method of claim 6, wherein said characteristic to be determined is whether first and second biochemical functional species bind with one another, and said step of introducing a sample to be analyzed into said first rectangular channel comprise introducing said first biochemical functional species into said channel and then introducing said second biochemical functional species into said channel to facilitate a binding reaction between said first and second biochemical species.

8. (original) The method of claim 7, wherein said first and second biochemical functional species are selected from the group comprising complimentary strands of DNA, complimentary proteins and antibody antigen pairs.

9. (original) The method of claim 6, wherein said substrate is selected to be formed from PDMS.

10. (original) The method of claim 6, wherein said laser beam is selected to have a diameter of 2 mm or less.

11. (original) The method of claim 10, wherein said channel is selected to have a width that is no larger than said diameter of said laser beam.

12. (original) The method of claim 6, wherein a second rectangular channel is formed in said substrate and said method further comprise the steps of introducing a reference sample in said second rectangular channel, determining a characteristic of said reference sample by analyzing said one or more intensity signals generated by said photodetector when said reference sample is in said second rectangular channel; and, employing said characteristic of said reference sample to compensate for background interference effects in the determination of said characteristic of said sample in said first channel.

13. (new) An interferometric detection system comprising:

a) a substrate;

b) a first channel formed in said substrate for reception of a liquid sample to be analyzed;

c) a coherent light source for generating a coherent light beam, said light source being positioned to direct said light beam into said channel to thereby generate backscattered light comprising interference fringe patterns, said fringe patterns including a plurality of spaced light bands whose positions shift in response to changes in the refractive index of said liquid sample; and

d) a photodetector for receiving said backscattered light and generating one or more intensity signals that vary as a function of positional shifts of said light bands.

14. (new) The interferometric detection system of claim 13, wherein said substrate is formed from PDMS.

15. (new) The interferometric detection system of claim 13, wherein said laser beam is selected to have a diameter of 2 mm or less.

16. (new) The interferometric detection system of claim 15, wherein said channel has a width that is no larger than said diameter of said laser beam.

17. (new) The interferometric detection system of claim 13, further including a second channel formed in said substrate, said second channel acting as a reference channel for detection and compensation of background interference.

18. (new) A method for determining a characteristic of a sample comprising the steps of:

a) providing an interferometric detection system comprising:

1) a substrate;

2) a first channel formed in said substrate for reception of a liquid sample to be analyzed;

3) a coherent light source for generating a coherent light beam, said light source being positioned to direct said light beam into said channel to thereby generate backscattered light comprising interference fringe patterns, said fringe patterns including a plurality of spaced light bands whose positions shift in response to changes in the refractive index of said liquid sample; and

4) a photodetector for receiving said backscattered light and generating one or more intensity signals that vary as a function of positional shifts of said light bands;

b) introducing a sample to be analyzed into said first channel; and

c) determining a characteristic of said sample by analyzing said one or more intensity signals generated by said photodetector when said sample is in said channel.

19. (new) The method of claim 18, wherein said characteristic to be determined is whether first and second biochemical functional species bind with one another, and said step of introducing a sample to be analyzed into said first channel comprises introducing said first and second biochemical functional species into said channel to facilitate a binding reaction between said first and second biochemical species.

20. (new) The method of claim 19, wherein said first and second biochemical functional species are selected from the group comprising complimentary strands of DNA, complimentary proteins and antibody antigen pairs.

21. (new) The method of claim 18, wherein said characteristic to be determined is whether a ligand in said sample binds with one or more receptors.

22. (new) The method of claim 21, wherein said receptors are immobilized in said channel.

23. (new) The method of claim 18, wherein said characteristic to be determined is a label-free analysis of a hybridization reaction in said channel.

24. (new) The method of claim 18, wherein said substrate is selected to be formed from PDMS.

25. (new) The method of claim 18, wherein said laser beam is selected to have a diameter of 2 mm or less.

26. (new) The method of claim 25, wherein said channel is selected to have a width that is no larger than said diameter of said laser beam.

27. (new) The method of claim 18, wherein a second channel is formed in said substrate and said method further comprise the steps of introducing a reference sample in said second channel, determining a characteristic of said reference sample by analyzing said one or more intensity signals generated by said photodetector when said reference sample is in said second channel; and, employing said characteristic of said reference sample to compensate for background interference effects in the determination of said characteristic of said sample in said first channel.